where the procedure is required for direct exposure of lesions such as tumors or granulomatous infections of the spine. There seems little reason to refute this judgment on the basis of the available evidence.

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Immediate Treatment of Spinal Cord Injuries

A PATIENT with a spinal cord injury that is clinically complete at 24 hours, as determined by accurate neurologic examination, will not have functional cord recovery. It is generally agreed that laminectomy is of little value and routine use of it has now been generally abandoned among paraplegists and at spinal injury centers.

Recent experimental evidence indicates that the neurologic damage may be due to edema within the constricting pia mater, which reduces venous return from the cord tissue. This decreases oxygen tension and the neurologic tissue suffers irreversible damage. Cooling of the cord with iced saline solution in the early post-injury phase has shown promise of being a method of avoiding the edema and the increased venous pressures. High doses of steroid administration and myelotomy also have shown some promise of decreasing the destruction of the neural tissue. Some investigators have found evidences of extremely high levels of nor-epinephrine locally in the damaged spinal cord tissue and have demonstrated the microscopic auto-destruction of the cord within four hours following injury. They have shown some ability to reverse this destructive tendency with monoamine inhibitors.

At the clinical level at present, however, there is no method of recovering lost neurologic function in the complete spinal cord injury. Early immediate care should be focused at realigning the spinal canal. Surgical treatment is indicated only for patients who have gross dislocations which cannot be reduced by closed methods. Whether to stabilize the spine surgically or treat it in traction until it heals by body repair mechanisms depends on the judgment of the physician who is responsible for the total treatment program of the patient. There is no evidence that surgical stabilization will increase neurologic return; however, a stable spine allows more rapid rehabilitation training and earlier discharge from the hospital.

Lest bladder infection develop, a Foley catheter should be inserted immediately and the urinary output monitored for 24 hours. At the end of that time the catheter should be withdrawn and the patient treated with intermittent catheterization. This has now been proved beyond doubt the best method by far for treating the "neurogenic bladder" to avoid over-distension and chronic infection.

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Little League Elbow

COMPETITIVE ORGANIZED BASEBALL PROGRAMS for boys in the 8- to 15-year age group have introduced new clinical entities such as Little League shoulder and Little League elbow involving the throwing arms of young pitchers.

Throwing a baseball hard as required by pitchers entails an abnormal whip-like action of the arm which places an unusual traction strain on the shoulder and elbow joints. In growing youngsters this traction strain is transmitted to, or through, the ununited epiphyses.

Comparative roentgenograms of both elbows of 162 youngsters in the 9- to 14-year age group demonstrated the so-called Little League elbow to be primarily involvement of the medial epicondylar epiphysis, with fragmentation, separation and accelerated growth noted in all 80 pitchers in the study. Less common, but more serious, were changes in the form of traumatic osteochondrosis of the capitellum of the humerus, head of the radius, and proximal humeral epiphysis.

Since these changes are caused by repetitious trauma, treatment is primarily preventive—rule changes to limit the amount of throwing by pitchers, and encouraging youngsters to report elbow or shoulder pain immediately and to stop pitching. The symptoms subside rapidly with rest at this stage, and the youngster can then resume

playing at other positions but should not pitch again until the epiphyses close. Coaches and supervisors should be educated that elbow pain in youngsters is due to epiphysitis and they should not recommend treatment techniques commonly used for adult pitching arms.

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Hand and Foot Problems in Drug Users

COMPLICATIONS with the injection of drugs into the extremities have increased epidemically. The magnitude of complication ranges from cellulitis to gas gangrene. The most serious complications in the extremities have occurred following inadvertent introduction of particulate matter into the arteries of the limbs. They vary according to the agent, amount, site of introduction, filler-substances, and delay in treatment.

Historically, intra-arterial injections of drugs have been a complication of drug administration for anesthesia or radiography. Now drug users who are "mainlining" sometimes inadvertently inject drugs into an artery and need emergency medical treatment.

The severity of disease is determined by vascular spasm, thrombosis, and ischemia. Tissue necrosis occurs as a consequence of intimal necrosis, vascular obstruction, and infection. Vascular involvement of the lower extremities is more commonly associated with amputation.

The syndrome of accidental arterial injections is one of immediate severe burning pain along the distribution of the vessel injected. The sensation is referred to as a "hand trip." The pain begins in the fingertips and extends proximally to the site of injection. The signs of ischemia are blanching of the tips of the digits, and the nailbeds soon appear cyanotic. A peripheral pulse may or may not be present.

The early inflammatory signs may progress rapidly to extensive swelling and discoloration of the limb. With treatment the symptoms may subside or progress to tissue necrosis and gangrene.

A high index of suspicion of drug abuse must be maintained. Treatment must be prompt. The most important aspect of treatment is heparinization to prevent thrombosis. The limb should be elevated slightly to improve venous drainage but not so much as to restrict arterial flow. The use of intra-arterial vasodilators, high molecular weight dextran, sympathetic blocking agents, and oxygen to increase the PO_2 of arterial blood has been advocated. There has been disagreement as to the efficacy of some of the above agents. The use of papaverine, topical anesthetic, and sympathectomy has not been universally effective.

Fasciotomy may limit the extent of ischemic muscle contracture. Amputation has been required in a large number of cases.

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Chymopapain Chemonucleolysis

CHYMOPAPAIN is the major proteolytic enzyme in papaya latex. It was first used for lysis of the nucleus pulposus of human discs in 1963. The pharmacologic action of chymopapain is on the non-collagenous protein interconnecting molecules of long-chain mucopolysaccharides causing dissolution of the bonds. The absence of effect on collagen assures that the annulus and the dural sac serve as effective barriers to indiscriminate digestion of other tissues. The enzyme has no direct effect on neural tissue, but inadvertent subarachnoid injection causes major hemorrhage and even death in experimental animals.

The indications are identical to those for classical laminectomy and discectomy. No effect would be expected in patients with spatial compromise due to causes other than disc degeneration or rupture.

Chemonucleolysis is performed under general anesthesia with bi-planar image intensifier control. The injection is made by the right lateral approach to avoid the subarachnoid space.

Several investigators have reported results similar to ours: 76.3 percent of our 422 patients had some degree of symptomatic improvement; in 32 percent results were rated excellent (pain-free and normally active for age).

The major complication has been anaphylac-